

**Data Evaluation Report on the Chronic Toxicity of BAS 062 W to Freshwater Invertebrates -
Daphnia sp.**

PMRA Submission Number {.....}

EPA MRID No. 467152-16

Data Requirement:	PMRA Data Code	{.....}
	EPA DP Barcode	D325185
	OECD Data Point	{.....}
	EPA MRID	467152-16
	EPA Guideline	850.1300

Test material:	BAS 062 W	Purity: 95.6%
Common name	Chlormequat chloride	
Chemical name:	IUPAC: 2-Chloroethyltrimethyl ammonium chloride	
	CAS name: Not reported	
	CAS No.: 999-81-5	
	Synonyms: Chlorocholine chloride	

Primary Reviewer: Brian D. Kiernan
EPA/OPP/EFED/ERB -

Date: 6/21/2006

BDC 10/17/2006

Reference/Submission No.: {.....}

Company Code	{.....}	[For PMRA]
Active Code	{.....}	[For PMRA]
Use Site Category:	{.....}	[For PMRA]
EPA PC Code	031401	

Date Evaluation Completed: 06-04-2006

CITATION: Elendt-Schneider. 1991. Determination of the chronic toxicity of BAS 062 W to the water flea *Daphnia magna* STRAUS. Unpublished study performed by BASF Aktiengesellschaft, Ludwigshafen, Germany. Laboratory Report No. 1/90/0942/51/1. BASF Registration Document No. 1991/10137. Study submitted by BASF Corporation, Research Triangle Park, NC. Study initiated October 24, 1990 and submitted April 2, 1991.

DISCLAIMER: This document provides guidance for EPA and PMRA reviewers on how to complete a data evaluation record after reviewing a scientific study concerning the chronic toxicity of a pesticide to freshwater invertebrates. It is not intended to prescribe conditions to any external party for conducting this study nor to establish absolute criteria regarding the assessment of whether the study is scientifically sound and whether the study satisfies any applicable data requirements. Reviewers are expected to review and to determine for each study, on a case-by-case basis, whether it is scientifically sound and provides sufficient information to satisfy applicable data requirements. Studies that fail to meet any of the conditions may be accepted, if appropriate; similarly, studies that meet all of the conditions may be rejected, if appropriate. In sum, the reviewer is to take into account the totality of factors related to the test methodology and results in determining the acceptability of the study.

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EXECUTIVE SUMMARY:

The 21-day-chronic toxicity of BAS 062 W (chlormequat chloride) to *Daphnia magna* was studied under static renewal conditions. Daphnids were exposed to BAS 062 W at nominal concentrations of 0 (negative control), 0.039, 0.078, 0.156, 0.313, 0.625, 1.25, 2.5, 5, and 10 mg ai/L. Only three test levels (0.313, 1.25, and 10 mg ai/L) were analyzed periodically for actual concentrations; the reviewer determined the time-weighted averages for these concentrations to be 0.317, 1.22, and 10.18 mg ai/L. These analytical results indicated that the test substance was stable during the 2- to 3-day static periods, and that the dosing procedure was accurate to nominal levels.

Following 21 days of exposure, cumulative mortality was 10% at the 10 mg ai/L treatment level. No other mortality occurred during the study at any control or treatment level. The 21-day EC_{50} was >10 mg ai/L. The NOAEC for adult survival was 10 mg ai/L.

It was reported that the time for first brood release was on day 8 for both the control and the highest treatment level, indicating no treatment-related effect on this endpoint. Raw data indicated that young were released at all levels by day 9 (day 8 was not a scheduled observation interval). A treatment-related reduction in the number of live offspring/surviving adult was observed at the 10 mg ai/L level (91.4 versus 114.0). Correspondingly, the number of dead offspring/surviving adult was elevated at this level. Although the number of aborted eggs per surviving adult was slightly increased at the 5 and 10 mg ai/L levels compared to the control (1.2, and 1.0, respectively, compared to 0.3), treatment responses were not normally distributed and a treatment-related effect could not be statistically supported. As a result, the NOAEC for reproduction was visually determined to be 5 mg ai/L.

A growth endpoint was not assessed.

This study is classified as SUPPLEMENTAL, as it provides some information useful for risk assessment purposes.

Results Synopsis

Test Organism Age (eg. 1st instar): First instar, 2-24 hours old
Test Type (Flow-through, Static, Static Renewal): Static renewal

21-day EC_{50} (survival): >10 mg ai/L	95% C.I.: N/A
Probit Slope: N/A	95% C.I.: N/A
NOAEC: 5 mg ai/L	
LOAEC: 10 mg ai/L	

Endpoint(s) affected: Reproduction

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I. MATERIALS AND METHODS

GUIDELINE FOLLOWED: The study protocol was based on procedures outlined in the EEC Guideline XI/681/86, Draft 4. Deviations from U.S. EPA OPPTS No. 850.1300 included:

1. The storage conditions of the test substance were not reported.
2. The culture conditions (e.g., temperature, lighting, flow-through versus static renewal design), age, health (including mortality rates), and reproductive history of the laboratory cultures were not provided.
3. The dilution water was not analyzed for particulate matter, TOC, ammonia, residual chlorine, metals, or pesticides.
4. The analytical LOD/LOQ values were not provided.
5. Concentrations were not verified at each test level; however, recovery results from the 0.313, 1.25, and 10 mg ai/L levels indicated that the test substance was stable during the static periods of the study.
6. A growth endpoint (total length or dry weight or both) was not determined.

These deviations did not affect the scientific soundness of the study.

COMPLIANCE: Signed and dated GLP, Quality Assurance and Data Confidentiality statements were provided. This study was conducted in compliance with GLP standards of the OECD (1983) and the 1st Amendment to the ChemG (1990).

A. MATERIALS:

1. Test Material BAS 062 W (chlormequat chloride)

Description: Solid

Lot No./Batch No. : N 9

Purity: 95.6%

Stability of compound under test conditions:

Water samples were collected at the beginning and the end of three of the 2- to 3-day periods (days 0 and 2, 7 and 9, and 16 and 19) for the nominal 0, 0.313, 1.25, and 10 mg ai/L treatment levels. Samples were collected from freshly-prepared media and then from aged media that contained daphnids and algae feed, and also from media that did not contain daphnids or algae feed. BAS 062 W was stable under the static renewal conditions of the study, and the presence of daphnia/algae did not affect concentration levels. Recoveries were 92.5-106.9% of nominal in freshly-prepared solutions, 96.4-106.0% in aged solutions that did not contain daphnia/algae, and 95.0-105.4% in aged solutions that did contain daphnia/algae.

(OECD recommends water solubility, stability in water and light, pKa, Pow, vapor pressure of test compound)

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Physicochemical properties of Chlormequat Chloride.

Parameter	Values	Comments
Water solubility at 20EC	>1000 mg/kg	
Vapor pressure	Not reported	
UV absorption	Not reported	
pKa	Not reported	
Kow	Not reported	

Storage conditions of

Test chemicals: Not reported

2. Test Organism:

Species: *Daphnia magna*, first instar, 2-24 hours old

EPA and OECD recommend Daphnia magna

Age of the parental stock: Not reported

EPA recommends that young daphnids #24 hours old from a separate parental culture be used

Source: Laboratory cultures were maintained in synthetic medium M4 under "standard conditions" (not otherwise specified).

EPA requires all test organisms must be produced from laboratory reared culture that has been maintained for at least 21 days at test conditions in dilution water with renewal of the culture medium at least three times per week.

B. STUDY DESIGN:

1. Experimental Conditions

a. Range-finding Study: None reported.

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b. Definitive Study

Table 1: Experimental Parameters

Parameter	Details	Remarks
		Criteria
<u>Parental acclimation:</u> Period: Conditions: (same as test or not) Feeding: Health (any mortality observed):	Continuous "Standard conditions" (not otherwise specified) Not reported Not reported	The clone of daphnia was supplied by Institut National de Recherche Chimique Appliquee, France in 1978. <i>EPA recommends that prior to testing, daphnids that are at least 10-12 days old (those that have had at least one brood) should be separated from the culture, put in separate container and maintained for at least 21 days to insure that good health conditions are present</i>
<u>Test condition:</u> static renewal/flow-through: Type of dilution system- for flow through method. Renewal rate for static renewal	Static renewal N/A Every Monday, Wednesday, and Friday	 <i>(EPA requires consistent flow rate of 5-10 vol/24 hours, meter systems calibrated before study and checked twice daily during test period)</i>
Aeration, if any	Prior to use, the prepared medium was aerated until saturated with oxygen. No aeration was described during testing.	<i>EPA recommends test chambers should not be aerated</i>
Duration of the test	21 days	<i>Recommended duration is 21 days.</i>

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Parameter	Details	Remarks
		Criteria
<u>Test vessel</u> Material: (glass/stainless steel) Size (for growth and reproduction/survival test): Fill volume:	Glass beakers 100 mL 50 mL	One animal was maintained per replicate vessel. 1. <u>Recommended Material:</u> Glass, No. 316 stainless steel, or perfluorocarbon plastics 2. <u>Recommended Size:</u> 250 ml with 200 ml fill volume; 100 ml with 80 ml fill volume OECD guideline recommends that parent animals be maintained individually; one per vessel, with 50 - 100 ml of medium in each vessel.
Source of dilution water	Synthetic medium M4 was prepared using ultrapure, deionized water (conductivity <0.05 µS/cm).	Recommended source of dilution water includes unpolluted well or spring water that has been tested for contaminants, or appropriate reconstituted water (see ASTM for details).

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Parameter	Details	Remarks
		Criteria
<u>Water parameters:</u>		
Hardness	Not analyzed	The standard hardness for the prepared medium was 2.70 ± 0.50 mmol/L.
pH	7.8-8.1 (measured in new and old test media)	Dissolved oxygen levels exceeded 60% of air saturation.
Dissolved oxygen	8.2-9.6 mg O ₂ /L (measured in new and old test media)	
Temperature	20.4-21.0°C (measured in new and old test media)	<i>Recommended hardness: 160 to 180 mg/L as CaCO₃; OECD recommends > 140 mg/L as CaCO₃</i>
Total Organic Carbon	Not determined	<i>Recommended pH: 7.6 to 8.0 pH should not deviate by more than 1.0 unit for more than 48 hours. OECD recommends that pH range be 6 - 9 and does not vary more than 1.5 units in any one test.</i>
Particulate matter	Not determined	<i>Recommended dissolved oxygen: renewal should not drop below 50% for more than 48 hours.</i>
Metals	Not determined	<i>Recommended flow-through: $\geq 60\%$ throughout test.</i>
Pesticides	Not determined	<i>Recommended temperature: 20EC \forall 2EC.; should not deviate from 20EC by more than 5EC for more than 48 hours. OECD recommends a range of 18 - 22°C; temperature should not vary more than \forall 2°C</i>
Chlorine	Not determined	<i>OECD guideline recommends that total organic carbon < 2 mg/L</i>
Number of replicates	10 replicates per level	<i>Number of replicates should include a control(s) and at least 5 test concentrations; dilution factor should not be greater than 50%. OECD recommends that at least 5 test concentrations be used in a geometric series with a separation factor not exceeding 3.2.</i>

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Parameter	Details	Remarks
		Criteria
<u>Number of organisms:</u> For growth and reproduction: For survival test:	1 per replicate 1 per replicate (same)	<i>Recommended number of organisms include 22 daphnids/test concentration; 7 test chambers should contain 1 daphnid each, and 3 test chambers contain 5 daphnids each. OECD recommends holding a minimum of 10 daphnids individually for static tests. For flow-through tests, 40 animals should be divided into 4 groups of 10 animals at each test concentration.</i>
<u>Treatment Concentrations:</u> nominal: measured:	0 (negative control), 0.039, 0.078, 0.156, 0.313, 0.625, 1.25, 2.5, 5, and 10 mg ai/L <LOD (control) 0.317 (nominal 0.313) mg ai/L 1.22 (nominal 1.25) mg ai/L 10.18 (nominal 10) mg ai/L Reviewer-calculated from raw data; remaining levels were not measured.	Water samples were collected at the beginning and the end of three of the 2- to 3-day periods (days 0 and 2, 7 and 9, and 16 and 19) of the renewal scheme for the nominal 0, 0.313, 1.25, and 10 mg ai/L treatment levels. Samples were collected from freshly-prepared media and then from aged media that contained daphnids and algae feed and also that did not contain daphnids or algae feed. BAS 062 W was stable under the static renewal conditions of the study, and the presence of daphnia/algae did not affect concentrations levels. Recoveries were 92.5-106.9% of nominal in freshly-prepared solutions, 96.4-106.0% in aged solutions that did not contain daphnia/algae, and 95.0-105.4% in aged solutions that did contain daphnia/algae.

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Parameter	Details	Remarks
		Criteria
Solvent (type, percentage, if used)	N/A	<p>Solvent concentration should not exceed 0.5 ml/L for static tests or 0.1 ml/L for flow-through tests. Recommended solvents include dimethylformamide, triethylene glycol, methanol, acetone and ethanol. OECD recommends #0.1 ml/L of solvent.</p>
Lighting	16 hours light/8 hours dark	<p>Light intensity was approximately 5-6 $\mu\text{E}/(\text{m}^2\text{-s})$ in the 400-700 nm range.</p> <p>Recommended photoperiod is 16 hours light and 8 hours of dark.</p>
Recovery of chemical:	92.5-106.9%	Based on actual sample data.
Frequency of measurement:	9 sampling events (representing three renewal periods)	
LOD:	Not reported	
LOQ:	Not reported	
Positive control {if used, indicate the chemical and concentrations}	N/A	
Other parameters, if any		
Loading:	The loading volume was 1 daphnid/50 ml solution.	
Feeding:	<p>The daphnia were fed with live laboratory-cultured green algae (<i>Scenedesmus subspicatus</i>) daily at increasing COD levels. The initial rate was 0.22 mg COD per daphnia per day, and increasing during the study to 0.75 mg COD per daphnia per day.</p>	

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2. Observations:

Table 2: Observations

Parameters	Details	Remarks
		Criteria
Data endpoints measured (list)	<ul style="list-style-type: none"> - Survival of first-generation daphnids - Number of live/dead young produced per adult - Number of aborted eggs per adult 	<p>A growth endpoint was not included.</p> <hr/> <p><i>Recommended endpoints measured:</i></p> <ul style="list-style-type: none"> - Survival of first-generation daphnids, - Number of young produced per female, - Dry weight (required) and length (optional) of each first generation daphnid alive at the end of the test, - Observations of other effects or clinical signs.
Observation intervals	Observations were made on days 0, 2, 5, 7, 9, 12, 14, 16, 19, and 21.	
Were raw data included?	Yes	
Other observations, if any	N/A	

II. RESULTS AND DISCUSSION

A. MORTALITY:

Following 21 days of exposure, cumulative mortality was 10% at the 10 mg ai/L treatment level. No other mortality occurred during the study at any control or treatment level. The 21-day EC₀ (NOAEC) was 10 mg ai/L.

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Table 3: Effect of BAS 062 W on Growth and Survival of *Daphnia* sp.

Treatment, mg ai/L Mean-measured (and Nominal) ^(a)	Mortality (dead or immobile)		Mean No. Live Offspring per adult	Mean No. Dead Offspring per adult ^(b)	Mean No. Aborted Eggs per adult ^(b)
	No. Dead	%			
Control (dilution water only)	0	0	114.0	0.0	0.3
(0.039)	0	0	112.5	0.0	0.6
(0.078)	0	0	114.8	0.0	0.4
(0.156)	0	0	109.0	0.0	0.7
0.317 (0.313)	0	0	107.7	0.0	0.6
(0.625)	0	0	99.9	0.0	8.9 ^(c)
1.22 (1.25)	0	0	107.7	0.0	0.2
(2.5)	0	0	117.8	0.0	0.4
(5)	0	0	104.9	0.4	1.2
10.18 (10)	1	10	91.4*	5.8	1.0
NOAEC	10 mg ai/L		5 mg ai/L		
LOAEC	>10 mg ai/L		10 mg ai/L		

^(a) Only the nominal 0 (control), 0.313, 1.25, and 10 mg ai/L treatment levels were analyzed for actual concentrations of test substance.

^(b) Endpoint not statistically assessed by the study author.

^(c) Anomaly not addressed by study author.

* Statistically different from control at p=0.05.

B. EFFECT ON REPRODUCTION:

It was reported that the time for first brood release was on day 8 for both the control and the highest treatment level, indicating no treatment-related effect on this endpoint. Raw data indicated that young were released at all levels by day 9 (day 8 was not a scheduled observation interval).

The number of live offspring per surviving adult was statistically-reduced compared to the control at the 10 mg ai/L level (91.4 versus 114.0). No treatment-related differences in reproduction were observed at the lower treatment levels compared to the control. The number of dead offspring per surviving adult and the number of aborted eggs per surviving adult were provided but apparently not statistically assessed. The number of dead offspring per adult was 0 for the control through 2.5 mg ai/L levels, 0.4 at the 5 mg ai/L level, and 5.8 mg ai/L level, indicating a treatment-related increase at the 10 mg ai/L level. The number of aborted eggs per surviving

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adult was 8.9 at the 0.625 mg ai/L level compared to 0.3 for the control. Raw data indicated that the difference observed at the 0.625 mg ai/L level was the result of one replicate, where a total of 71 eggs were aborted. The incidence of aborted eggs was also slightly elevated at the 5 and 10 mg ai/L levels (1.2 and 1.0 aborted eggs/adult, respectively) compared to the control. However, a treatment-related effect could not be affirmed. Based on the reduced number of live offspring/adult, the reproductive NOAEC was 5 mg ai/L.

A growth endpoint was not assessed.

C. REPORTED STATISTICS:

The LC₀ for mortality was visually determined. For reproduction, the overall mean number of live offspring per surviving adult was compared using Duncan's multiple range test, and the LOAEC and NOAEC values were based on significance data. Results were provided in terms of nominal concentrations.

D. VERIFICATION OF STATISTICAL RESULTS:

Statistical Method: The 21-day EC₅₀ was verified visually, as mortality did not exceed 10% in this study; the NOAEC based on mortality was also verified visually. The NOAEC for total number of live young per parent was determined using ANOVA, as data satisfied the assumptions of normality and homogeneity of variances. Data for aborted eggs per live parent animal did not satisfy the assumption of normality, so the NOAEC for this endpoint was determined using the non-parametric Wilcoxon Rank Sum test via TOXSTAT statistical software. These calculations were performed using the reviewer calculated time-weighted averages for the three levels that were provided and nominal concentrations for all other levels.

21-day EC ₅₀ (survival): >10 mg ai/L	95% C.I.: N/A
Probit Slope: N/A	95% C.I.: N/A
NOAEC: 10 mg ai/L	
LOAEC: >10 mg ai/L	

E. STUDY DEFICIENCIES:

A growth endpoint was not assessed in this study.

F. REVIEWER'S COMMENTS:

The reviewer's conclusions regarding the NOAEC for reproduction (number of live young per parent) differed from the study author's, as the reviewer's analysis did not detect any significant differences among treatment groups using ANOVA. Because the study author's conclusions are more conservative estimates of toxicity, they are reported in the Executive Summary and Conclusions sections.

Actual concentrations of ai were not determined for all treatment levels, but recoveries of BAS 062 W from the three sampled levels indicated precision and accuracy of the test concentrations.

In-life dates for the definitive study were October 24 - November 14, 1990.

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G. CONCLUSIONS:

This study is classified as SUPPLEMENTAL, as it provides some information useful for risk assessment purposes.

21-day EC₅₀ (survival): >10 mg ai/L

95% C.I.: N/A

Probit Slope: N/A

95% C.I.: N/A

NOAEC: 5 mg ai/L

LOAEC: 10 mg ai/L

Endpoint(s) affected: Reproduction

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III. REFERENCES:

Deutsches Institut für Normung. 1981. Bestimmung der biologischen Wirkung von Wasserinhaltsstoffen auf Kleinkrebse (Reproduktionstest mit *Daphnia magna*), DIN 38 412 (Entwurf). OECD. Guideline 202, Part II.

OECD. 1981. Test Guideline 202 (*Daphnia*, acute immobilization and 14-day reproduction tests).

Committee on Methods for Toxicity Testing with Aquatic Organisms. 1975. Methods for Acute Toxicity Tests with Fish, Macroinvertebrates and Amphibians. EPA-660/3-75-009.

Müller, P.H. 1975. Lexikon der Stochastik. Wissenschaftliche Buchgesellschaft, 2nd edition.

Elendt, B.P. 1990. Untersuchungen zur Ernährung von Daphnien; Dissertation, Heidelberg University.

SAS/STAT Guide for personal computers, version 6 edition. 1987. Cary, NC, SAS Institute Inc., pp. 1-1028.

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APPENDIX I. OUTPUT OF REVIEWER'S STATISTICAL VERIFICATION:

concentration			time	CT	concentration			time	CT
0.313 mg/L			0.311	1	0.311			1.16	1
			0.313	3				1.2	3
			0.325	1				1.3	1
			0.332	3				1.21	3
			0.306	1				1.24	1
			0.309	3				1.23	3
				12					12
				3.804					14.62

TWA=0.317

TWA=1.218

concentration			time	CT
10 mg/L			9.97	1
			9.82	3
			9.83	1
			10.58	3
			10.69	1
			10.15	3
				12
				122.14

TWA=10.178

number of live young per parent

File: 5216r Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	9	5214.098	579.344	1.249
Within (Error)	89	41291.922	463.954	
Total	98	46506.020		

Critical F value = 2.04 (0.05,9,60)

Since $F < \text{Critical } F$ FAIL TO REJECT H_0 :All groups equal

number of live young per parent

File: 5216r Transform: NO TRANSFORMATION

BONFERRONI T-TEST - TABLE 1 OF 2

H_0 :Control<Treatment

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GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	control	114.000	114.000		
2	0.039	112.500	112.500	0.156	
3	0.078	114.800	114.800	-0.083	
4	0.156	109.000	109.000	0.519	
5	0.317	107.700	107.700	0.654	
6	0.625	99.900	99.900	1.464	
7	1.22	107.700	107.700	0.654	
8	2.5	117.800	117.800	-0.394	
9	5	104.900	104.900	0.945	
10	10.18	91.444	91.444	2.279	

Bonferroni T table value = 2.60 (1 Tailed Value, P=0.05, df=80,9)

number of live young per parent

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BONFERRONI T-TEST - TABLE 2 OF 2

Ho:Control<Treatment

GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL
1	control	10			
2	0.039	10	25.045	22.0	1.500
3	0.078	10	25.045	22.0	-0.800
4	0.156	10	25.045	22.0	5.000
5	0.317	10	25.045	22.0	6.300
6	0.625	10	25.045	22.0	14.100
7	1.22	10	25.045	22.0	6.300
8	2.5	10	25.045	22.0	-3.800
9	5	10	25.045	22.0	9.100
10	10.18	9	25.732	22.6	22.556

number of live young per parent

File: 5216r

Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model)

TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	control	10	114.000	114.000	114.000
2	0.039	10	112.500	112.500	113.650
3	0.078	10	114.800	114.800	113.650
4	0.156	10	109.000	109.000	109.000
5	0.317	10	107.700	107.700	108.275
6	0.625	10	99.900	99.900	108.275
7	1.22	10	107.700	107.700	108.275
8	2.5	10	117.800	117.800	108.275
9	5	10	104.900	104.900	104.900

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10 10.18 9 91.444 91.444 91.444

number of live young per parent

File: 5216r

Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 2 OF 2

IDENTIFICATION	ISOTONIZED MEAN	CALC. WILLIAMS	SIG P=.05	TABLE WILLIAMS	DEGREES OF FREEDOM
control	114.000				
0.039	113.650	0.036		1.67	k= 1, v=89
0.078	113.650	0.036		1.75	k= 2, v=89
0.156	109.000	0.519		1.77	k= 3, v=89
0.317	108.275	0.594		1.78	k= 4, v=89
0.625	108.275	0.594		1.79	k= 5, v=89
1.22	108.275	0.594		1.79	k= 6, v=89
2.5	108.275	0.594		1.80	k= 7, v=89
5	104.900	0.945		1.80	k= 8, v=89
10.18	91.444	2.279	*	1.80	k= 9, v=89

s = 21.540

Note: df used for table values are approximate when v > 20.

number of aborted eggs

File: 5216a

Transform: NO TRANSFORM

WILCOXON RANK SUM TEST W/ BONFERRONI ADJUSTMENT - Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	RANK SUM	CRIT. VALUE	REPS	SIG
1	control	0.300				
2	0.039	0.600	118.00	71.00	10	
3	0.078	0.400	109.00	71.00	10	
4	0.156	0.700	123.00	71.00	10	
5	0.317	0.600	118.50	71.00	10	
6	0.625	8.900	126.50	71.00	10	
7	1.22	0.200	109.00	71.00	10	
8	2.5	0.400	113.50	71.00	10	
9	5	1.200	124.00	71.00	10	
10	10.18	1.000	101.00	59.00	9	

Critical values use k = 9, are 1 tailed, and alpha = 0.05